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52	E. R. Squibb & Sons' Research and Biological Laboratories, New Bruns- wick, N. J.	Diphtheria antitoxin, antigenococcic serum, antime- ningococcic serum, antistreptococcic serum, antita- nic serum, normal horse serum, antirabic virus, bacterial vaccines, and leucocyte extract.
53	Laboratory of Clinical Pathology, Kan- sas City, Mo.	Antirabic virus.
54	Dr. James McI. Phillips, Columbus, Ohio.	Do.
55	Chemische Fabrik Güstrow, Güstrow i. M., Germany.	Staphylococcus vaccine.

TRACHOMA.

A SURVEY OF ITS PREVALENCE IN THE MOUNTAIN SECTIONS OF NORTH AND SOUTH CAROLINA.

By A. D. FOSTER, Passed Assistant Surgeon, United States Public Health Service.

Owing to the fact that trachoma has been found to be prevalent in certain sections in the mountain counties of Kentucky, West Virginia, and Virginia, it was deemed advisable to make a survey also of the mountainous regions of the States of North and South Carolina for the purpose of determining the prevalence of the disease in that part of these States which is traversed by the continuation of the Appalachian mountain system.

The mountains of North Carolina may be conveniently classed as four separate chains, the Smoky, forming the western boundary of the State; the Blue Ridge, running across the State in a very tortuous course and shooting out as spurs of great elevation; the Brushy (which divides for the greater part of its course the waters of the Catawba and Yadkin), beginning at a point near Lenoir and terminating in the Pilot Mountains; and an inferior range of much lower elevation, which may be termed from its local name at different points, the Uwharrie or Oconeechee Mountains.

Each of these mountain ranges is marked by distinct characteristics. The Smoky chain as contrasted with the next highest, the Blue Ridge, is more continuous, more elevated, more regular in its directions and height, and rises very uniformly from 5,000 to nearly 6,700 feet. The Blue Ridge is composed of many fragments scarcely connected into a continuous and regular chain. Its loftier summits range from 5,000 to 5,900 feet. The Brushy range presents throughout the greater part of its course a remarkable uniformity in direction and elevation, many of its peaks rising above 2,000 feet. The last, the Oconeechee or Uwharrie range, sometimes presents a succession of elevated ridges, then a number of bold and isolated knolls the heights of which are 1,000 feet above the sea level.

Mention is here made of these several mountain ranges on account of their natural influence in separating the population of this area and because they limit more or less communication with other States.

The Smoky Mountains which form the western boundary of the State, because of their height are a natural barrier to travel from other States to the west of them. Until 1907 only one railroad crossed this range. In that year another railroad was built which connects this part of North Carolina with parts of Tennessee, Virginia, and West Virginia. The populations in these mountains are more or less isolated, and travel east and west is naturally very limited.

In accordance with official orders the survey was begun at the State School for the Blind at Raleigh, N. C., on November 26, 1913, and was completed at Travelers Rest, S. C., on April 22, 1914.

In connection with work done in several counties in the lowland section of South Carolina in which a medical inspection of the pupils of the public schools was made by the writer, particular attention was also paid to the eyes to determine the prevalence of trachoma.

In the course of the survey 21 counties in the mountainous sections of North and South Carolina and 5 counties in the lowland section of South Carolina were visited and 16,805 persons were examined for trachoma. Of these 34 had the disease, .002 per cent.

TABLE 1.—*Showing number of persons examined and of cases of trachoma found in counties of North and South Carolina visited.*

NORTH CAROLINA.

County.	White schools.	Pupils.	Teachers.	Colored schools.	Pupils.	Teachers.	Other individuals.	Cases of trachoma.
Wake.....	1	178	.....	1	177	.....	.....	1 1
Surry.....	6	1,294	.....	1	71	.....	.....	.....
Wilkes.....	4	711	.....	1	37	.....	.....	.....
Caldwell.....	8	959	5	1	117	.....	.....	6
Catawba.....	1	592	.....	1	119	.....	.....	.....
Buncombe.....	11	2,768	10	4	617	.....	35	.....

¹ This was the only case of trachoma found in a negro in either North or South Carolina.

TABLE 1.—*Showing number of persons examined and of cases of trachoma found in counties of North and South Carolina visited—Continued.*

NORTH CAROLINA—Continued.

County.	White schools.	Pupils.	Teachers.	Colored schools.	Pupils.	Teachers.	Other individuals.	Cases of trachoma.
Haywood.....	4	1,074	17	1	63	3		
Jackson.....	5	383	13					
Cherokee.....	2	523	7				7	3
Swain.....	5	522	3				8	20
Henderson.....	7	541	8	2	128			
Polk.....	5	234	5				108	
Transylvania.....	4	329						
Mitchell.....	1	55					76	3
Avery.....	2	121	3	1	12			
Watauga.....	3	251	15				5	
Yancey.....	2	145	6					
Total.....	71	10,680	92	13	1,341	3	239	33

SOUTH CAROLINA.

Oconee.....	4	480	12	1	112			
Pickens.....	13	524	2				120	
Greenville.....	7	309						
Spartanburg.....	2	294	8					
Florence.....	4	964		1	756			
Darlington.....	2	510		1	115			1
Dillon.....	1	52						
Marlboro.....	1	64						
Horry.....	2	128						
Total.....	36	3,325	22	3	983		120	1

This survey shows that trachoma is prevalent among the Indians living on the Cherokee Indian Reservation in Swain County, N. C., which fact has already been noted by Fricks, by whom an examination of the pupils of the Indian school was made in 1912; also that the disease has spread to the white population residing in the neighborhood adjacent to the Indian reservation. The survey also reveals the fact that the disease is present among the native-born population of Mitchell County, N. C., and Caldwell County, N. C. In other sections of North Carolina visited there was a remarkable absence of the disease as compared with the mountainous sections of Kentucky, Virginia, and West Virginia.

An inspection of a large number of the population of the mountainous sections of the State of South Carolina, comprising Oconee, Pickens, and Greenville Counties, failed to disclose any cases of this disease in these counties.

Examinations for trachoma were confined almost exclusively to the school population for the reason that school children are representative of the population of any given section and because it is possible to examine a greater number of individuals in schools in a given time.

As the opportunity presented, examinations of the employees of a number of cotton mills were carried out, as the employees of these

mills were as a rule originally natives of the mountainous sections of the State.

In a number of localities house-to-house inspections were made, especially in those localities in which it was reported to the writer that there were cases of "sore eyes" among residents. This inspection brought to light numerous cases of folliculosis, blepharitis, and keratitis, to which condition the name "granulated lids" had been misapplied by residents of these localities.

Purpose of Survey.

The purpose of the survey was, as previously stated, to determine whether trachoma was present among the mountain population of the Carolinas, to determine if possible the probable source of infection, and to bring to the attention of local physicians and school boards the dangers of this disease and the necessity for early diagnosis in order that the disease might be treated in its incipiency.

Origin of Trachoma Among the Mountainous Population.

In the case of the three trachomatous persons found in Mitchell County, N. C., no definite information could be obtained as to the duration of the disease. All three of these cases showed cicatricial tissue in the lids, and in one there were marked pannus and entropion, thus showing that the disease had existed for some years.

A resident of Penland, N. C., a small village a few miles from where the three cases of trachoma were found, stated that at the time of construction of the Carolina, Clinchfield & Ohio Railroad a number of cases of eye trouble were seen among the native inhabitants. This railroad extends from Spartanburg, S. C., to Dante, Va., and is the only means of communication between this section of North Carolina and Tennessee, Virginia, and West Virginia. It was stated that native-born labor was first employed in the construction of this road, and towards its completion foreign labor was utilized.

The six cases observed at Whitnell and Hudson, in Caldwell County, N. C., were among school children, all of whom were native-born Americans. All of the cases were in an acute stage of the disease, showing no formation of pannus or entropion indicating a recent infection.

The cases found at Andrews, in Cherokee County, and at Ela, in Swain County, N. C., may have received the infection from contact with Cherokee Indians, of whom there are a considerable number living in this vicinity. As previously noted, trachoma exists among the pupils of the Indian school located at Cherokee, which is 6 miles from the village of Ela.

Damage to Vision.

In the case of a colored girl, an inmate of the State School for the Blind, at Raleigh, N. C., serious damage to vision had resulted from the disease. This girl had double pannus with light perception only. One case seen in Mitchell County, that of a girl of about 17 years, had double pannus, entropion, and trichiasis, and as a result her vision was seriously damaged, preventing her from attending school, although able to do housework at home.

Trachoma in the Negro.

In order to determine the prevalence of the disease in the negro race an examination of as many colored schools as possible was made during the course of the survey.

In this survey 2,324 negroes were examined in 16 different schools in the Carolinas and only one case of trachoma was found among them. These findings agree with those of Clark and Schereschewsky to the effect that the negro is not immune to trachoma, but that the prevalence of the disease is much less than in the white race.

Trachoma and Nationality.

The population of the mountain sections of North Carolina and South Carolina is made up almost exclusively of native-born Americans. In only one locality was there any considerable number of foreign born. At Mount Airy, in Surry County, N. C., a number of Scotch and North Italians were found, employed as stone cutters in a granite quarry at that place. Permission was obtained to examine the employees of this quarry, and among about 200 examined no case of trachoma was found. In the schools of Mount Airy a number of children of foreign parentage were examined, but no case of trachoma was found.

In the lowland section of South Carolina it was noticed that a number of Greeks and Syrians had migrated to the smaller towns and had established themselves in business. Particular attention was given to children of foreign extraction during the examination of schools in this section in order to determine the presence of trachoma among them, but no case was found.

Educational Features of the Survey.

In order to stimulate interest among health and school authorities in the work talks were given at the various schools visited. These talks to the teachers and pupils dealt not only with the subject of trachoma and other eye conditions but with the subject of medical inspection of school children in general. In many localities a keen interest in the health and welfare of school children was manifested by school authorities and teachers.

Conclusions.

Based on this survey the following conclusions are presented:

1. Trachoma exists to some extent in several isolated localities in the mountainous sections of North Carolina. Although not widespread, the disease is present in three different localities in different parts of the State.

2. In only one locality, the Indian school at Cherokee, N. C., had measures been taken to determine the presence of the disease and to control its spread.

3. Foreign immigration does not appear to have been a factor in the introduction of trachoma in the mountainous section of North Carolina.

4. The negro race in these two States is practically free from the disease.

5. Treatment should be instituted in existing cases of trachoma to prevent its spread to others.

Details of Trachoma Prevalence in Counties Visited.

NORTH CAROLINA.

Wake County, N. C.—The survey of Wake County was limited to the examination of the pupils of the State Schools for the Blind, located at Raleigh, N. C. As the pupils of these schools come from various sections of the State, it was thought advisable to make an examination of these pupils with the idea that it might possibly furnish an index as to the presence of trachoma within the State.

In the two schools for the blind, one for the white and one for colored persons, at Raleigh, 355 persons were examined, of whom 178 were white and 177 colored. Only one case of trachoma was found and this was in the colored school. This was in a colored girl who was admitted to the school two months previously from Wilson, N. C. The disease was in an advanced stage, with marked pannus and considerable cicatricial tissue in both upper lids.

Surry County, N. C.—An examination for trachoma was made of 7 schools at various points in this county. This county is important on account of a considerable number of Italian workmen employed in a granite quarry at Mount Airy. The children of many of the Italians attend the public schools of Mount Airy. No case of trachoma was observed among the workmen who were examined at the quarry, nor among the pupils of the public schools.

Place.	Institution.	Number examined.	Place.	Institution.	Number examined.
Elkin.....	Public school....	273	Mount Airy.....	Colored school...	71
Siloam.....	do.....	52	Do.....	Granite quarry..	150
Rockford.....	do.....	55			
Pilot Mountain.....	do.....	166	Total.....		1,515
Mount Airy.....	do.....	748			

Caldwell County, N. C.—In this county there are numerous cotton mills, many of the employees of which are people from the mountain regions. Schools in seven different localities in this county were examined for trachoma which was found at two places, Hudson and Whitnell.

Place.	Institution.	Number examined.	Cases of trachoma.	Percentage of trachoma.
Lenoir.....	Public school.....	552		
Do.....	Colored school.....	117		
Hudson.....	Public school.....	157	5	3.18
Whitnell.....	do.....	68	1	1.47
Fairview.....	do.....	58		
Valmead.....	do.....	45		
Patterson.....	do.....	15		
Do.....	Agricultural school.....	24		
Piney Grove.....	Public school.....	45		
Total.....		1,081	6	.55

These six cases of trachoma were all acute cases, indicating a recent infection. In the public school at Hudson, N. C., four of the five cases observed were among pupils in the same class room. The infection was probably transmitted by contact, as there were no common washbasins or towels in use at the school. Many of the pupils in the vicinity refused examination; and if a more thorough examination had been made the percentage of trachoma cases would undoubtedly have been higher.

Catawba County, N. C.—The examination in this county was limited to the examination of pupils in the public schools, both white and colored, of the town of Hickory, which is the county seat. All the schools in the county were closed for the Christmas holidays before the schools in other sections of the county could be visited. No case of trachoma was found.

Place.	Institution.	Number examined.
Hickory.....	Public school.....	592
Do.....	Colored school.....	119
Total.....		711

Buncombe County, N. C.—This county is the most populous of the mountain counties of North Carolina. It is in direct communication, by railroad, with the mountainous sections of Tennessee. The examinations were confined to the public schools of the city of Asheville and the towns of West Asheville, South Biltmore, and Black Mountain. No trachoma was found.

Place.	Institution.	Number examined.
Weaverville.....	Weaverville College.....	108
Asheville.....	Public schools.....	2,778
Do.....	Colored school.....	617
Marshall.....	Cotton mill.....	35
West Asheville.....	Public school.....	320
South Biltmore.....	do.....	174
Black Mountain.....	do.....	128
Total.....		4,160

Haywood County, N. C.—No trachoma was found.

Place.	Institution.	Number examined.
Clyde.....	Public school.....	186
Do.....	Haywood Institute.....	45
Canton.....	Public school.....	462
Waynesville.....	do.....	398
Do.....	Colored school.....	66
Total.....		1,157

Jackson County, N. C.—No trachoma was found.

Place.	Institution.	Number examined.
Webster.....	Public school.....	97
Cullohwee.....	do.....	34
Sylva.....	do.....	141
Do.....	Baptist institute.....	51
Dillsboro.....	Public school.....	73
Total.....		396

Cherokee County, N. C.—Three cases of trachoma were found.

Place.	Institution.	Number examined.	Cases of trachoma.	Percentage of trachoma.
Murphy.....	Public school.....	209		
Andrews.....	do.....	321	3	0.93
Do.....	House inspection.....	7		
Total.....		537	3	.55

The three cases of trachoma observed at Andrews, N. C., were among pupils of the public schools. These cases showed the presence of cicatricial tissue in the eyelids but no pannus or entropion. These were cases in which the patients were not aware that they had the disease. The other members of the family were examined for trachoma but no other cases were found. It is probable that the disease was contracted through contact with the Indians, who are quite numerous in this vicinity, one of the trachomatous children mentioned having associated with an Indian child who was affected with the disease.

Swain County, N. C.—The examination in this county included the examination of the pupils of the Indian school at Cherokee, as well as schools at four other points in the county.

Place.	Institution.	Number examined.	Cases of trachoma.	Percentage of trachoma.
Cherokee.....	Indian school.....	207	18	8.69
Bryson City.....	Public school.....	203		
Birdtown.....	do.....	15		
Whittier.....	do.....	59		
Ela.....	do.....	41	2	4.87
Total.....		525	20	3.80

A survey of the pupils of the Indian school was made by Fricks, of the Public Health Service, in 1912. The records of the institution show that at the time the survey was made in 1912 a total of 16 cases of trachoma was found among the pupils. At the examination made by the writer a little more than a year later 18 cases were observed. These cases had been under treatment by physicians at the Indian school, and prophylactic measures had been enforced to limit the spread of the disease.

The two cases observed at Ela were found among the pupils of the public school. Both cases were in members of the same family. A visit to their house was made and 8 other individuals were examined, but no other case was found.

Henderson County, N. C.—The examination in this county included 7 white schools and 2 colored schools located at different parts of the county. No trachoma was found.

Place.	Institution.	Number examined.
Hendersonville.....	Public school.....	166
Flat Rock.....	do.....	86
Do.....	Colored school.....	50
Hendersonville.....	do.....	78
Fruitland.....	Fruitland Institute.....	147
Balfour.....	Mountain Orphanage.....	45
Pleasant Hill.....	Public school.....	35
Valley Hill.....	do.....	13
Balfour.....	do.....	57
Total.....		677

Polk County, N. C.—It had been reported to the writer that trachoma was present in this county, but an examination of five schools and the employees of one hosiery mill in this county failed to reveal any case of trachoma.

Place.	Institution.	Number examined.
Columbus.....	High school.....	49
Lynn.....	Public school.....	53
Do.....	Lynn Hosiery Mill.....	108
Tryon.....	Public school.....	54
Saluda.....	do.....	5
Do.....	Saluda Seminary.....	78
Total.....		347

Wilkes County, N. C.—In this county four white schools and one colored school were examined. No case of trachoma was found.

Place.	Institution.	Number examined.
Wilkesboro.....	Public school.....	197
North Wilkesboro.....	do.....	362
Do.....	Public school (colored).....	37
Roaring River.....	Public school.....	65
Ronda.....	do.....	87
Total.....		748

Transylvania County, N. C.—No trachoma found.

Place.	Institution.	Number examined.
Brevard.....	Brevard Institute.....	60
Do.....	Public school.....	167
Penrose.....	High school.....	54
Davidsons River.....	Public school.....	48
Total.....		329

Mitchell County, N. C.—Three cases of trachoma found.

Place.	Institution.	Number examined.	Cases of trachoma.	Percentage of trachoma.
Bakersville.....	Public school.....	55	.....	.....
Altapass.....	House-to-house inspection.....	76	3	3.94
Total.....	.....	131	3	2.29

These three cases of trachoma were found in one family living about 3 miles from the village of Altapass, N. C. They were native-born Americans who had always lived in Mitchell County. One of the cases showed considerable pannus and trichiasis in addition to cicatricial tissue in the eyelids, showing that the disease had existed for some time. Two other children were affected to a lesser degree although considerable cicatricial tissue was present in the eyelids of each. The remaining members of the family, consisting of the father and mother and six children, showed no signs of the disease although they lived in intimate contact with those suffering with trachoma and no precautions had been taken to prevent the spread of the disease.

Avery County, N. C.—No trachoma found.

Place.	Institution.	Number examined.
Elk Park.....	Public school.....	59
Do.....	Colored school.....	12
Cranberry.....	Public school.....	65
Total.....	.....	136

Watauga County, N. C.—No trachoma found.

Place.	Institution.	Number examined.
Valle Cruces.....	Industrial school.....	56
Do.....	Public School.....	17
Boone.....	Appalachian Training School.....	193
Do.....	House-to-house inspection.....	5
Do.....	.....	271

Yancey County, N. C.—No trachoma found.

Place.	Institution.	Number examined.
Burnsville.....	Yancey Collegiate Institute.....	88
Do.....	Stanley-McCormick School.....	63
Total.....	.....	151

SOUTH CAROLINA.

The survey for trachoma in the mountainous sections of South Carolina embraced the examination of schools in the upper part of Oconee, Pickens, Greenville, and Spartanburg Counties.

Oconee County, S. C.—No trachoma found.

Place.	Institution.	Number examined.	Place.	Institution.	Number examined.
Newry.....	Public school.....	63	Jordania.....	Public school....	50
Do.....	Cotton mill.....	160	Walhalla.....	do.....	156
Seneca.....	Public school.....	223			
Do.....	Colored school.....	112	Total.....		764

Pickens County, S. C.—No trachoma found.

Place.	Institution.	Number examined.	Place.	Institution.	Number examined.
Pickens.....	Public school.....	192	Hampton.....	Public school....	9
Do.....	Cotton mill.....	120	olf Creek.....	do.....	28
Norris.....	Public school.....	37	Bethlehem.....	do.....	29
Six Mile.....	do.....	41	Roanoke.....	do.....	70
Cateechee.....	do.....	15	Gates.....	do.....	39
Newtown.....	do.....	17	Maynard.....	do.....	7
Rock.....	do.....	17			
Montvale.....	do.....	25	Total.....		646

Greenville County, S. C.—No trachoma found.

Place.	Institution.	Number examined.	Place.	Institution.	Number examined.
Marietta.....	Public school.....	44	Locust.....	Public school....	77
Highlands.....	do.....	27	Travelers Rest.....	do.....	53
Tiger.....	do.....	46			
Tigerville.....	do.....	43	Total.....		309
Pleasant Hill.....	do.....	19			

Spartanburg County, S. C.—No trachoma found.

Place.	Institution.	Number examined.
Landrum.....	Public school.....	202
Do.....	Spartan Academy.....	100
Total.....		302

A survey for trachoma was also made in several counties in the lowland section of the State of South Carolina. This work was done in connection with a general medical examination of the pupils of the public schools in various sections of Florence, Darlington, Marlboro, Dillon, and Horry Counties.

Place.	Institution.	Number examined.	Cases of trachoma.
Florence, S. C.....	Public schools.....	964	.....
Do.....	Colored school.....	750	.....
Darlington, S. C.....	Public school.....	510	1
Do.....	Colored school.....	115	.....
Little Rock, S. C.....	Public school.....	52	.....
McColl, S. C.....	do.....	64	.....
Conway, S. C.....	do.....	128	.....
Loris, S. C.....	do.....		.....
Total.....		2,589	1

Only one case of trachoma was found among the pupils of the public schools in the above survey. This case was a young girl, a pupil in the public school at Darlington, S. C. This girl was born in Camden, S. C., of American parentage. The eyelids showed scar tissue and the disease had evidently existed for a considerable length of time. The home of this case was visited and the mother and three children were examined, but no other case of trachoma was found.